

## Claims

1. A method for controlling an internal combustion engine with an intake tract (1) and an exhaust tract (4) incorporating a three-way catalytic converter (22), and with at least one cylinder (Z1 - Z4) which communicates with the intake tract (1) depending on the position of a gas inlet valve (14) and which communicates with the exhaust tract (4) depending on the position of a gas outlet valve (15), and an injection valve (19) assigned to the cylinder (Z1 - Z4) and which meters fuel in, a post-cat oxygen sensor (37) which is disposed downstream of the three-way catalytic converter (22) in the exhaust tract (4), wherein
- a mass of fuel to be supplied (MFF) which is to be supplied to the relevant cylinder (Z1 - Z4) is determined as a function of a load variable,
  - a mass of fuel to be metered-in on a one-time basis (MFF\_ADD) is determined if the measurement signal (MS) of the post-cat oxygen sensor (37) is characteristic of at least one predefined residual oxygen component, namely as a function of the response of the measurement signal (MS) of the post-cat oxygen sensor (37),
  - a corrected mass of fuel to be supplied (MFF\_COR) is determined as a function of the mass of fuel to be supplied (MFF) and possibly of the mass of fuel to be metered-in on a one-time basis (MFF\_ADD) and
  - an actuating signal for controlling the injection valve (19) is generated as a function of the corrected mass of fuel to be supplied (MFF\_COR).
2. The method as claimed in claim 1,
- wherein the mass of fuel to be metered-in on a one-time basis (MFF\_ADD) is determined if the measurement signal (MS)

of the post-cat oxygen sensor (37) is below a predefined first threshold (THD1).

3. The method as claimed in one of the preceding claims,  
5 wherein the mass of fuel to be metered-in on a one-time basis (MFF\_ADD) is predefined in such a way that approximately 50 % of the oxygen storable in the three-way catalytic converter (22) remains after the metering-in of the mass of fuel to be metered-in on a one-time basis  
10 (MFF\_ADD).
4. The method as claimed in one of the preceding claims,  
wherein the mass of fuel to be metered-in on a one-time basis (MFF\_ADD) is determined as a function of an estimated  
15 value (OSC) of the current oxygen storage capacity of the three-way catalytic converter (22).
5. The method as claimed in one of the preceding claims,  
wherein the mass of fuel to be metered-in on a one-time  
20 basis (MFF\_ADD) is determined as a function of a gradient (GRAD\_MS) of the measurement signal (MS) of the post-cat oxygen sensor (37).
6. The method as claimed in one of the preceding claims,  
25 wherein the mass of fuel to be metered-in on a one-time basis (MFF\_ADD) is determined as a function of a minimum value (MIN\_MS) of the measurement signal (MS) of the post-cat oxygen sensor (37) while the measurement signal (MS) of the post-cat oxygen sensor (37) is characteristic of at  
30 least one predefined residual oxygen component.
7. A method for controlling an internal combustion engine with an intake tract (1) and an exhaust tract (4) incorporating a three-way catalytic converter (22), and with at least one

cylinder (Z1 - Z4) which communicates with the intake tract (1) depending on the position of a gas inlet valve (14) and which communicates with the exhaust tract (4) depending on the position of a gas outlet valve (15), and an injection valve (19) assigned to the cylinder (Z1 - Z4) and which meters fuel in, a post-cat oxygen sensor (37) which is disposed downstream of the three-way catalytic converter (22) in the exhaust tract (4), wherein

- a mass of fuel reduced on a one-time basis (MFF\_RED) is determined if the measurement signal (MS) of the post-cat oxygen sensor (37) is characteristic of at least one predefined residual fuel component, namely as a function of the response of the measurement signal (MS) of the post-cat oxygen sensor (37),
- a corrected mass of fuel to be supplied (MFF\_COR) is determined as a function of the mass of fuel to be supplied (MFF) and if necessary minus the mass of fuel reduced on a one-time basis (MFF\_RED) and
- an actuating signal for controlling the injection valve (19) is generated as a function of the corrected mass of fuel to be supplied (MFF\_COR).

8. The method as claimed in claim 7, wherein the mass of fuel reduced on a one-time basis (MFF\_RED) is determined if the measurement signal (MS) of the post-cat oxygen sensor (37) exceeds a predefined second threshold value (THD2).

9. The method as claimed in one of the claims 7 or 8, wherein the mass of fuel reduced on a one-time basis (MFF\_RED) is predefined such that approximately 50 % of the oxygen storable in the three-way catalytic converter (22) is stored after a mass of fuel correspondingly reduced by the reduced mass of fuel (MFF\_RED) has been metered-in.

10. The method as claimed in one of the claims 7 to 9,  
wherein the mass of fuel reduced on a one-time basis  
(MFF\_RED) is determined as a function of an estimated value  
5 (OSC) of the current oxygen storage capacity of the three-  
way catalytic converter.
11. The method as claimed in one of the claims 7 to 10,  
wherein the mass of fuel reduced on a one-time basis  
10 (MFF\_RED) is determined as a function of a gradient  
(GRAD\_MS) of the measurement signal (MS) of the post-cat  
oxygen sensor (37).
12. The method as claimed in one of the claims 7 to 11,  
15 wherein the mass of fuel reduced on a one-time basis  
(MFF\_RED) is determined as a function of a maximum value  
(MAX\_MS) of the measurement signal (MS) while the  
measurement signal (MS) of the post-cat oxygen sensor (37)  
is characteristic of at least one predefined residual fuel  
20 component.
13. An apparatus for controlling an internal combustion  
engine with an intake tract (1) and an exhaust tract (4)  
incorporating a three-way catalytic converter (22); and with  
25 at least one cylinder (Z1 - Z4) which communicates with the  
intake tract (1) depending on the position of a gas inlet  
valve (14) and which communicates with the exhaust tract (4)  
depending on the position of a gas outlet valve (15), and an  
injection valve (19) assigned to the cylinder (Z1 - Z4) and  
30 which meters fuel in, a post-cat oxygen sensor (37) which is  
disposed downstream of the three-way catalytic converter  
(22) in the exhaust tract (4),  
wherein the apparatus has means of  
- determining, as a function of a load variable, a mass of

fuel to be supplied (MFF) which is to be supplied to the relevant cylinder (Z1 - Z4),

- determining a mass of fuel to be metered-in on a one-time basis (MFF\_ADD) if the measurement signal (MS) of the post-cat oxygen sensor (37) is characteristic of at least one predefined residual oxygen component, namely as a function of the response of the measurement signal (MS) of the post-cat oxygen sensor (37),
- determining a corrected mass of fuel to be supplied (MFF\_COR) as a function of the mass of fuel to be supplied (MFF) and if necessary of the mass of fuel to be metered-in on a one-time basis (MFF\_ADD) and
- generating an actuating signal for controlling the injection valve (19) as a function of the corrected mass of fuel to be supplied (MFF\_COR).

14. An apparatus for controlling an internal combustion engine with an intake tract (1) and an exhaust tract (4) incorporating a three-way catalytic converter (22), and with at least one cylinder (Z1 - Z4) which communicates with the intake tract (1) depending on the position of a gas inlet valve (14) and which communicates with the exhaust tract (4) depending on the position of a gas outlet valve (15), and an injection valve (19) assigned to the cylinder (Z1 - Z4) and which meters fuel in, a post-cat oxygen sensor (37) which is disposed downstream of the three-way catalytic converter (22) in the exhaust tract (4),
- wherein the apparatus has means of
- determining a mass of fuel reduced on a one-time basis (MFF\_RED) if the measurement signal (MS) of the post-cat oxygen sensor (37) is characteristic of at least one predefined residual fuel component, namely as a function of the response of the measurement signal (MS) of the post-cat oxygen sensor (37),

23

- determining a corrected mass of fuel to be supplied (MFF\_COR) as a function of the mass of fuel to be supplied (MFF) and if necessary minus the mass of fuel reduced on a one-time basis (MFF\_RED) and

5 - generating an actuating signal for controlling the injection valve (19) as a function of the corrected mass of fuel to be supplied (MFF\_COR).

10